

Geocoding Oregon Water Resources Department Well Logs & Exploring the Relationship between Surface Elevation and Depth to Groundwater



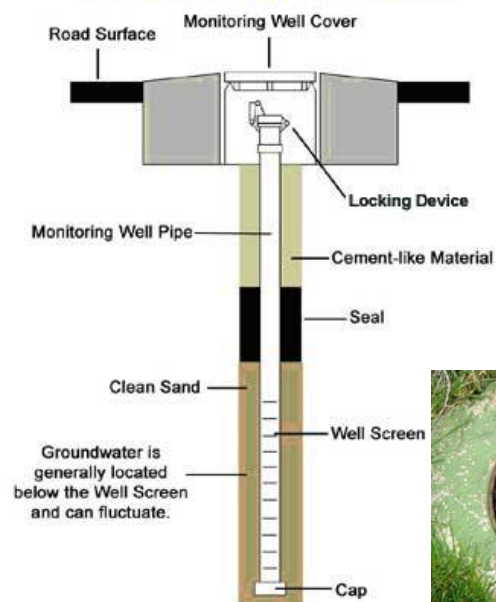
Data Sources

- Water Resources Department Well Logs
http://apps.wrd.state.or.us/apps/gw/well_log/well_log.php
- ESRI Tiger File location:
http://www.esri.com/data/download/census2000_tigerline/index.html
- Digital Elevation Map (NED) from:
<http://seamless.usgs.gov/website/seamless/viewer.php>
- Counties, State Boundary, Geology:
<http://www.gis.state.or.us/data/alphalist.html>
- Soils from:
http://www.or.nrcs.usda.gov/pnw_soil/or_data.html

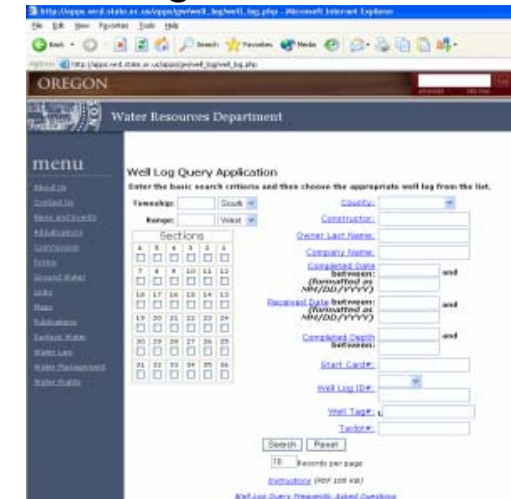
Location of Study Area



MONITORING WELL DIAGRAM



Oregon Water Resources Well Log Database Query



The screenshot displays the Oregon Water Resources Well Log Database Query application. The browser address bar shows the URL: http://apps.wed.state.or.us/welllog/well_log.php. The page features a navigation menu on the left with links such as "About Us", "Contact Us", "News and Alerts", "Administrative", "Construction", "Forms", "Ground Water", "Leads", "Maps", "Publications", "Regulation", "Water Law", "Water Measurement", and "Water Quality". The main content area is titled "Well Log Query Application" and includes a search criteria section with fields for Township, County, Range, and Section. Below these fields is a grid of checkboxes for selecting specific sections. The right side of the page contains fields for "Completed Depth", "Estimated Depth", "Well Log ID", "Well Type", and "Location". At the bottom, there are buttons for "Search" and "Print", along with a "Records per page" dropdown menu and a "Database (PDF 108 KB)" link.



Results of WRD Query

Well Log Query Results - Microsoft Internet Explorer

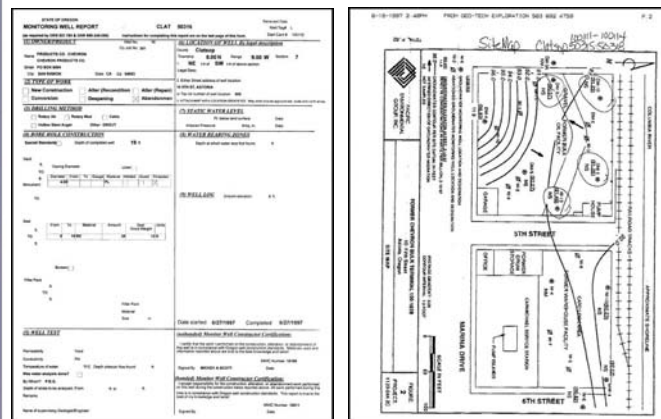
Address: http://apps.wrd.state.or.us/apps/bw/well_log/well_log.php?action=results&page&township_rdr=0&township_char=0&range_rdr=0&range_char=0§=0§=0§=0

Well Log Query Results

Township: 8N, Range: 9W, Section: 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36

Well Log	T.R./S/Q-Q	Taxlot	Street of Well	Owner	Company	Well Type	First Water	Completed Depth	Best Water Level	Yield	Completed Date	Received Date	Bonded Constructor	Structure	Well ID #	Abandon	Depth	Remarks
CLAT 203	8.2N/8.2W/7 NE-SE	4003	75 W MARINE DR ASTORIA	MOONEY, W A		M	7.0	7.0	7.0		05/28/1992	05/12/1992	VANDENY, GREG	38002	X			
CLAT 202	8.2N/8.2W/7 NE-SE	805	12 8TH ST ASTORIA		CHEVRON	M	10.0	20.0	10.0		10/23/1993	12/05/1993	ROGERS, ROBERT	38058	X			
CLAT 831	8.2N/8.2W/7 NE-SE		228 MARINE DR ASTORIA		UNOCAL CERT NORTHERN REGION	M	4.0	10.0	3.0		05/24/1994	07/05/1994	BURROUGHS, JOHN	38007	X			
CLAT 832	8.2N/8.2W/7 NE-SE		TERMINAL 3022		UNOCAL CORP.	M	8.0	20.0	8.0		02/02/1995	02/10/1995	NEPHEVER, MICHAEL	71093	X			
CLAT 3033	8.2N/8.2W/7 NW-SE	4003	75 W MARINE DR ASTORIA	MOONEY, JR	MR WILLIAM A	M	3.0	7.0	4.0		04/28/1996	05/21/1996	RICHOLT, ROBERT S RICHOLT	38059	X			
CLAT 2088	8.2N/8.2W/7 SW-SE	2803			YOUNG'S BAY DEVELOPMENT CO	M	4.0	0.0	4.0		03/09/1996	03/10/1996	SHAW, NEIL NEIL SHAW CONSULTING GEOLOGIST	86479 11340	X			
CLAT 3033	8.2N/8.2W/7 NW-SE	4020	85 W MARINE DR ASTORIA	PATERSON, DON	ASTORIA VINT MART	G	21.0	8.0			05/28/1996	07/04/1996						
CLAT 20302	8.2N/8.2W/7 SW-NW		228 MARINE DR ASTORIA		UNOCAL TS	M	11.0	21.0	11.0		10/20/1996	09/21/1996	CASEY, DANIEL LOGAN	12303 33076	X			
CLAT 30321	8.2N/8.2W/7 SW-NW		228 MARINE DR ASTORIA		UNOCAL TS	M	11.0	21.0	11.0		10/22/1996	09/21/1996	CASEY, DANIEL SCOTT	12303 33077	X			

Well Logs



Problems with the Well Log Database

- Database is only searchable by Township and Range. Needs for larger datasets are cumbersome to fulfill.
- Wells are only located with address information, not geographic coordinates.
- Wells are not given elevation information – i.e., they are assumed to lie at the same elevation.
- Addresses are not updated, and many are out-of-date (some wells are 100+ years old).
- User is given a hyperlinked text file and the option to download a tab-delimited file.
 - Locating wells within a given area is very time-consuming.

Open in MSEXCEL and save as DBF4

	A	B	C	D	E	F	G	H	I	J	K	L	M
	county_code	well_log_id	version	startcard_num	township	top_char	range	mg_char	section	quarter_40	quarter_160	name_last	name_first
1	CLAT	256	1	30302	8 N	9 W	7 NW	SE				MOONEY	WA
2	CLAT	390	1	68536	8 N	9 W	7 NE	SE					
3	CLAT	438	1	65557	8 N	9 W	7 NE	SE					
4	CLAT	488	1	73593	8 N	9 W	7 NE	SE					
5	CLAT	50135	1	88608	8 N	9 W	7 NW	SE				MOONEY JR	MR WILLI
6	CLAT	50468	1	96475	8 N	9 W	7 SW	SW					
7	CLAT	50565	1		8 N	9 W	7 NW	SE				PATERSON	DON
8	CLAT	50850	1	123030	8 N	9 W	7 SW	NW					
9	CLAT	50931	1	123031	8 N	9 W	7 SW	NW					
10	CLAT	52170	1		8 N	9 W	7 SW	SW					
11	CLAT	52171	1		8 N	9 W	7 SW	SW					
12	CLAT	51230	1		8 N	9 W	7 NE	SE					
13	CLAT	51303	1		8 N	9 W	7 NE	SE					
14	CLAT	51463	1	137937	8 N	9 W	7 NW	SW					
15	CLAT	51463	1		8 N	9 W	7 SW	SW				LEVOFF	ROBERT
16	CLAT	51465	1		8 N	9 W	7 SW	SW				LEVOFF	ROBERT
17	CLAT	51477	1		8 N	9 W	7 SW	SW				LEVOFF	ROBERT
18	CLAT	51479	1		8 N	9 W	7 SW	SW				LEVOFF	ROBERT
19	CLAT	51486	1		8 N	9 W	7 SW	SW				LEVOFF	ROBERT
20	CLAT	51512	1		8 N	9 W	7 SE	SW					
21	CLAT	51515	1		8 N	9 W	7 SE	SW					
22	CLAT	51519	1		8 N	9 W	7 NE	SW				TUSSING	TOM
23	CLAT	51521	1		8 N	9 W	7 NE	SW				TUSSING	TOM
24	CLAT	51524	1		8 N	9 W	7 NE	SW				TUSSING	TOM
25	CLAT	51528	1		8 N	9 W	7 NE	SW					
26	CLAT	51654	1	155816	8 N	9 W	7 NE	SW				FERRILL	GORDON
27	CLAT	287	1		8 N	9 W	7						
28	CLAT	50316	1	100112	8 N	9 W	7 NE	SW				CHEVON	PRODUC
29	CLAT	50556	1		8 N	9 W	7 NW	SE				PATERSON	DON
30	CLAT	50562	1		8 N	9 W	7 NW	SE				PATERSON	DON
31	CLAT	51181	1	135192	8 N	9 W	7 NW	SE				CAPE	GENE
32	CLAT	51182	1	135194	8 N	9 W	7 NW	SE				CAPE	GENE
33	CLAT	51231	1		8 N	9 W	7 NE	SE					
34	CLAT	42227	1		8 N	9 W	7 NW	SW				LEVOFF	DYREBT

Well Log Statistics

- Started with 1402 well records from Water Resources.
- 404 records have Static Water Level Data recorded and non-zero.
- Correlation coefficient between surface elevation and Static Water Levels was calculated as 0.98 (Very High Correlation).

Creating an Address Locator

New US Streets (F file) Address Locator

Name: ADD_LOC_Streets_file
Description: US Streets (File-based)

Primary table: [Empty]
Reference data: Y:\PROJECT\ASTORIA_DATA\Niger_file\at_tigerres\41481

☐ Store relative path names

Fields

House From Left: FRADDL
House To Left: TOADDL
House From Right: FRADDR
House To Right: TOADDR
Prefix Direction: FEDIRP
Prefix Type: <None>
Street Name: FENAME
Street Type: FETYPE
Suffix Direction: FEDIRS

Input Address Fields

The field containing: Street is recognized if it is named: street-01-v001

Matching Options

Place Name Alias Table: <None>
Spelling sensitivity: 80
Minimum candidate score: 10
Minimum match score: 60

Intersections

Connectors: % | @ Separate connectors by a space, e.g. % | @ . /

Output Options

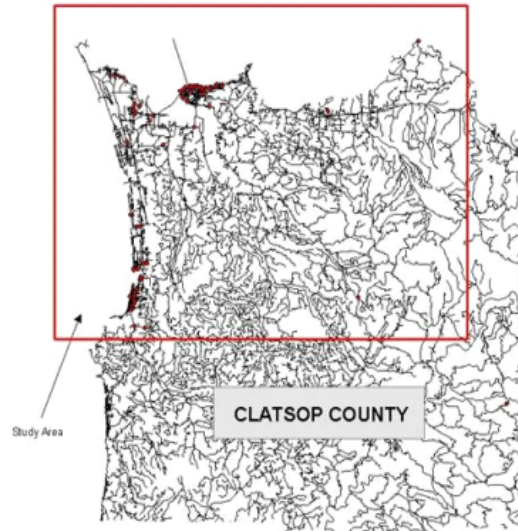
Side offset: 0 in Reference data units
End offset: 3 %
☒ Match if candidates tie

Output Fields

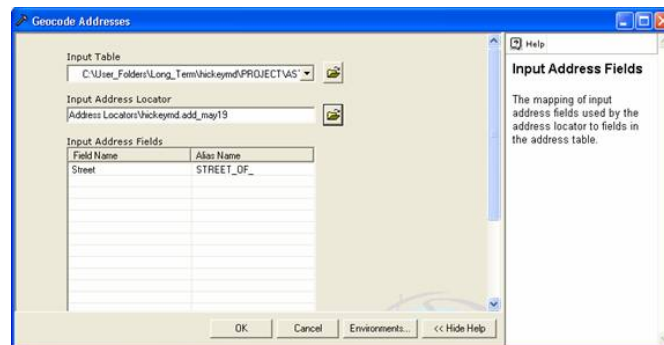
☒ X and Y coordinates ☒ Standardized address
☐ Reference data ID ☐ Percent along

Help OK Cancel

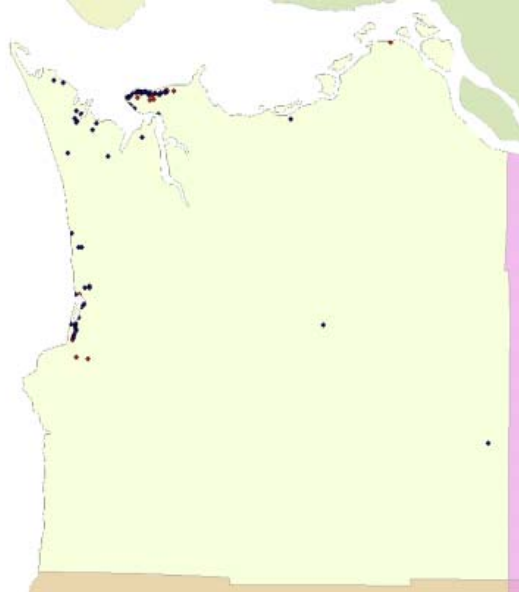
Well Logs and Tiger File



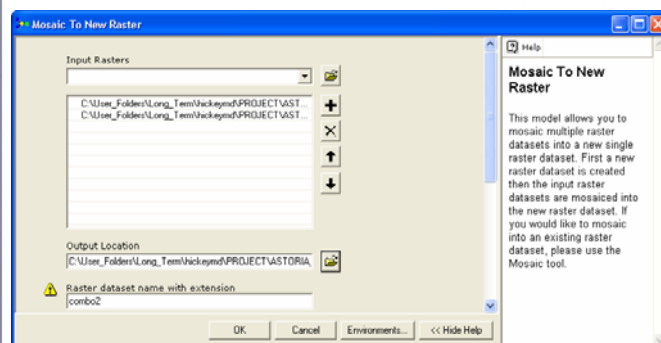
Geocoding Wells by Address



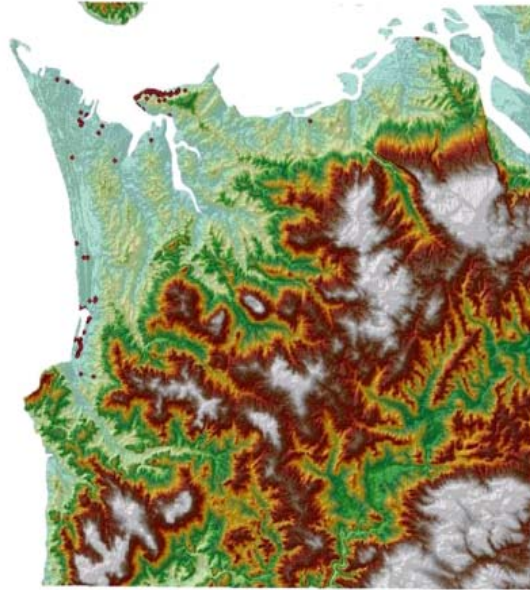
Geocoded Wells with non-zero Static Water Level Data



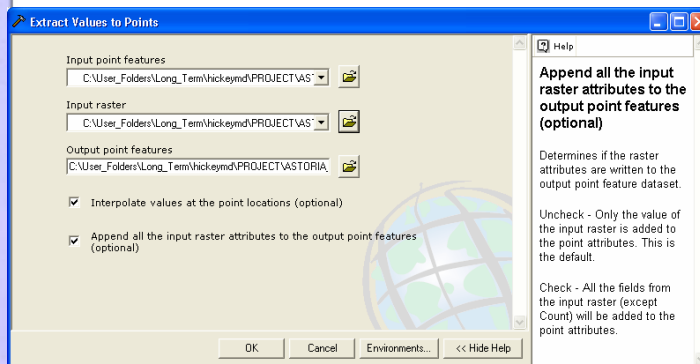
DEM File from USGS was in pieces and needed to be joined using the “Mosaic to New Raster”



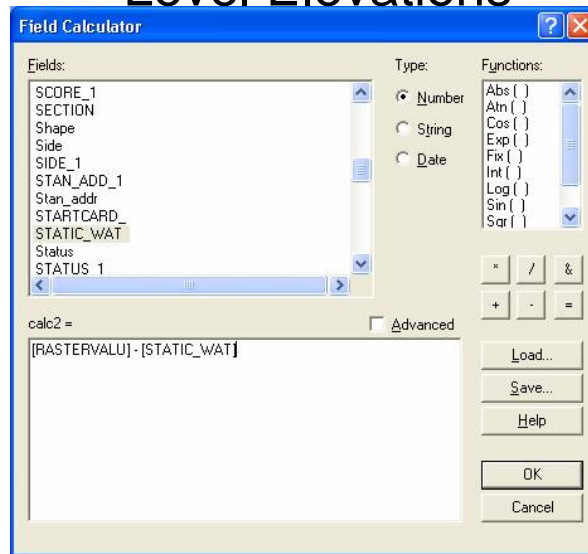
Geocoded Wells and Color-coded Elevation and Hillshade Map



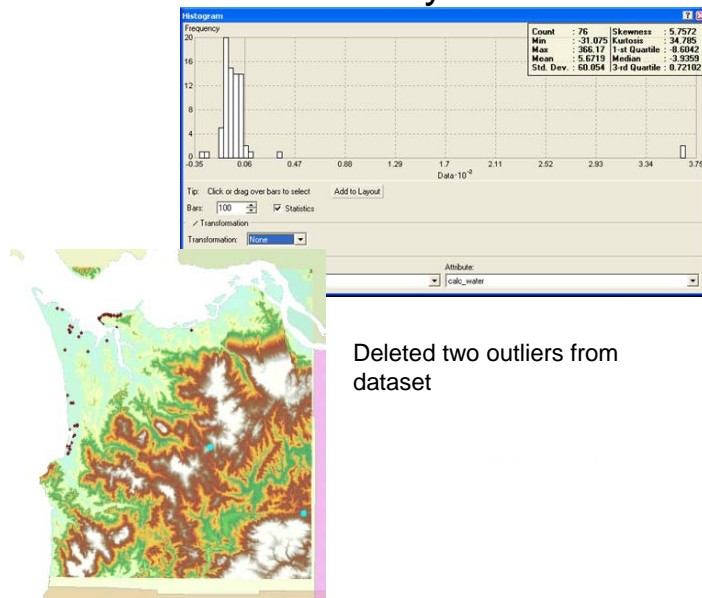
Used Extract “Values to Points” tool in ArcMAP Spatial Analyst Toolbox to append Elevation data to each well



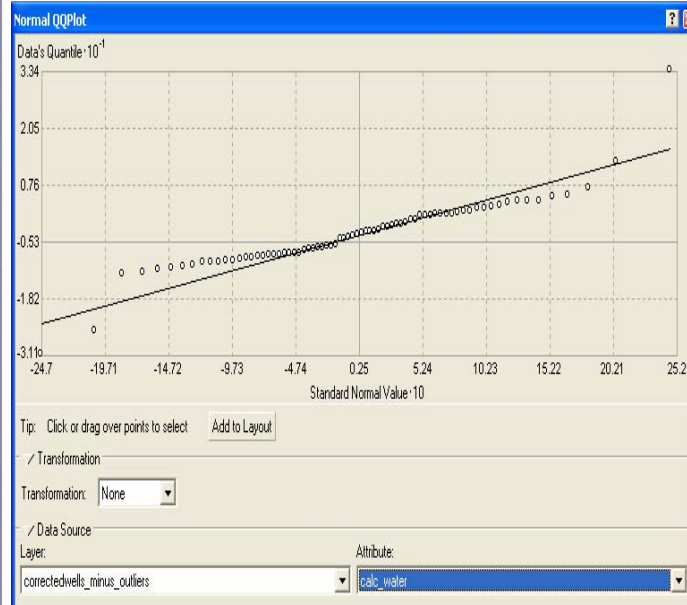
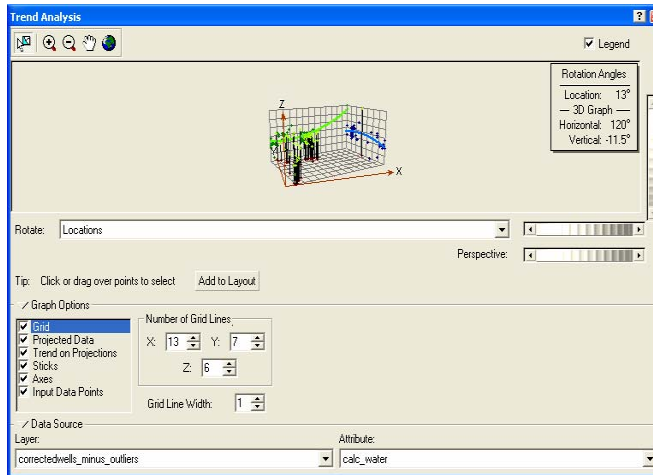
Calculation of Static Water Level Elevations



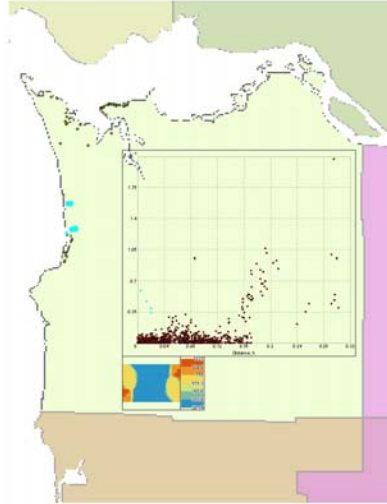
Explored Data using Geostatistical Analyst Tools



Trend Analysis Shows Parabolic Trends both North/South and East/West



Variance between corrected static water level elevations for a few wells in near Seaside is high.



Ordinary Kriging

